Table of Contents

As a technology innovator, Fairchild Semiconductor has manufactured EEPROMs since 1981, being the first to market with the Serial MICROWIRE family. Currently, Fairchild offers 3 families of EEPROM: MICROWIRE, I^2C, and SPI, with densities ranging from 256 bits to 65,536 (64K) bits in serial interface formats. Fairchild EEPROMs continue to lead the marketplace in ease of use and hardware interfacing.

Fairchild die is designed in Santa Clara, California, fabricated and tested in West Jordan, Utah. The memory devices are fabricated using Fairchild Semiconductor's floating gate CMOS process for high reliability, high endurance and low power consumption. Fairchild is committed to excellence in design, manufacturing, and responsiveness to our customers through the continued development of new technologies.

Handbook Preface

This document provides the user with guidelines in selecting the appropriate unencapsulated die or wafers and helps facilitate custom packaging by the user. Specific information pertaining to the performance of each die type can be found in the product datasheet. Properly packaged die and wafers will perform according to DC, AC and functional specifications defined in the device datasheet. The focus of this handbook is to provide the information for procuring and assembling the die products. This booklet needs to be used in conjunction with the current EEPROM datasheets (found on the Fairchild Semiconductor website "http://www.fairchildsemi.com") and the current CS100HEE Serial Interface EEPROM Qualification Booklet.

Selection Guides

FAIRCHILD
SEMICONDUCTOR™

I²C CMOS EEPROM

General Description

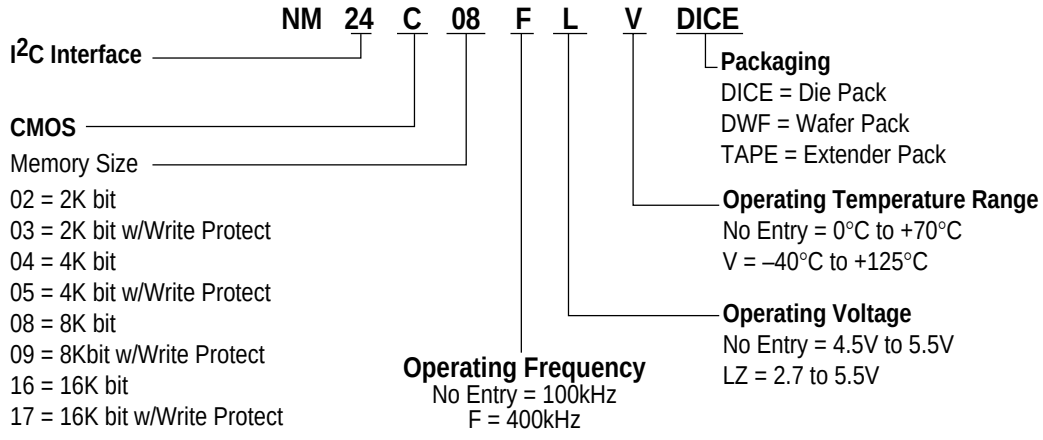
Fairchild Semiconductor's family of I²C™ compatible CMOS EEPROMs share the following features: A serial interface and software protocol allowing operation on a two wire bus. Also, programming of the upper half of the memory can be disabled by connecting the WP pin to V_{cc} on certain family members. Fairchild Semiconductor EEPROMs offer 1 million data changes typical with data retention greater than 40 years.

Features

- Hardware write protect for upper half of memory array on 03/05/09/17
- Low power CMOS
  - 1 mA active current typical
  - 10 μA standby current typical
  - 0.1 μA standby current typical (LZ)
- 2-wire serial interface
- Bidirectional data transfer protocol
- Sixteen byte page write mode, minimizes total write time per byte
- 2.7V to 5.5V operation available (LZ) Self-timed write cycle with typical write cycle time of 5 ms
- Data retention greater than 40 years
- Endurance: 10^6 data changes

Available Product

	Temperature Ranges	4.5V-5.5V	2.7V-5.5V	Security
NM24C02	C,V	Y	Y	
NM24C03	C,V	Y	Y	Y
NM24C04	C,V	Y	Y	
NM24C05	C,V	Y	Y	Y
NM24C08	C,V	Y	Y	
NM24C09	C,V	Y	Y	Y
NM24C16	C,V	Y	Y	
NM24C17	C,V	Y	Y	Y



SPI CMOS EEPROM

General Description

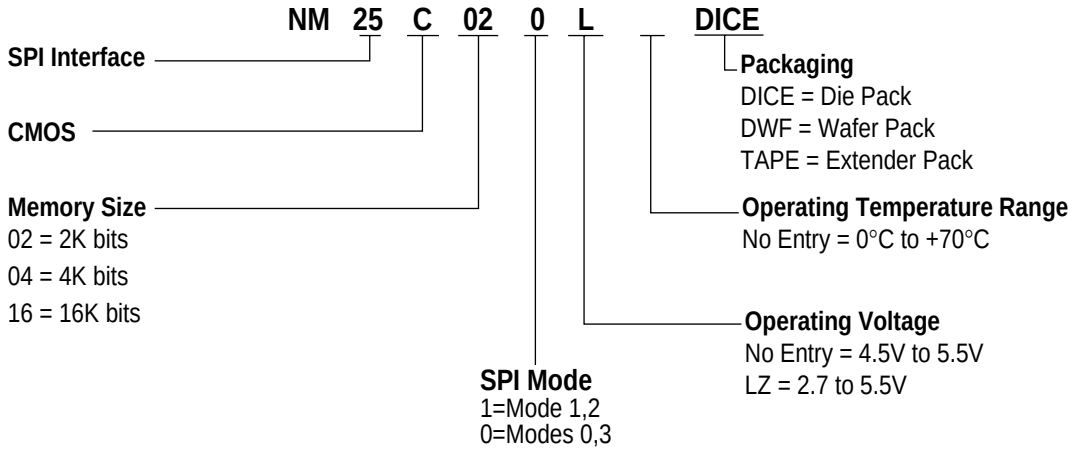
Fairchild Semiconductor family of SPI CMOS EEPROM devices share the following features: A serial interface and software protocol allowing operation on a 3-wire bus. Also, programming of the memory can be disabled by both hardware and software means. Fairchild Semiconductor EEPROMs offer 1 million data changes typical with data retention greater than 40 years.

Features

- 2.1 MHz clock rate
- Multiple chips on the same 3-wire bus with separate chip select lines
- Self-timed programming cycle
- Programming of multiple byte simultaneously
- Status register can be polled during programming to monitor READY/BUSY
- Write Protect (WP) pin and write disable instruction for both hardware and software write protection
- Block write feature to protect against accidental writes
- Endurance: 10^6 data changes
- Data retention greater than 40 years

Available Product

	Temperature Ranges	4.5V - 5.5V	2.7V - 5.5V
NM25C020	C	Y	Y
NM25C040	C	Y	Y
NM25C041	C	Y	Y
NM25C160	C	Y	Y



MICROWIRE™ CMOS EEPROM

General Description

Fairchild Semiconductor offers a family of CMOS EEPROMs which share the following features: MICROWIRE serial interface, floating gate M2CMOS™ technology, extended voltage (2.7V - 5.5V) R/W range or 5V R/W only, Directwrite, and self-timed programming cycle with programming status on the data out pin. There are also several features not shared by all family members, which separate the family into three groups. These features are operating voltage range, write protection, and sequential register read. Other differences are memory size and operating temperature range. Although for the purposes of this selection guide the family will not be separated by these differences, as each individual device is available with all of these value added options.

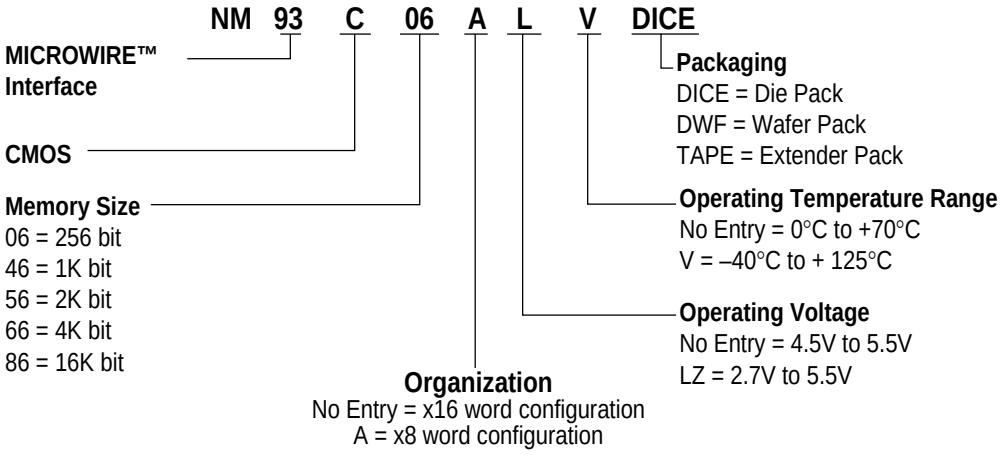
Features

- 40 year data retention
- Extended voltage operation
- Endurance: 10^6 data changes
- Reliable CMOS floating gate technology
- Single voltage operation in all modes
- MICROWIRE compatible serial interface
- Directwrite, no erase cycles required
- Self-timed programming cycle
- Device status signal during programming mode

Available Product

	Temperature Ranges	4.5V - 5.5V	2.7V - 5.5V
NM93C46	C,V	Y	Y
NM93C56	C,V	Y	Y
NM93C66	C,V	Y	Y
NM93C86*	C,V	Y	Y

** "A" version x8 and x16 available only.*



Product Family Fact Sheets

FAIRCHILD
SEMICONDUCTOR™

NM24Cxx

Standard 2-Wire Bus Interface Serial EEPROM Family

General Description

The NM24Cxx devices are 2,048/4,096/8,192/16,834 bits of CMOS non-volatile electrically erasable memory. These devices conform to all specifications of the I²C™ 2-wire protocol and are designed to minimize device pin count and simplify PC board layout requirements.

The upper half of the memory of the 03/05/09/17 can be disabled (Write Protected) by connecting the WP pin to V_{CC}. This section of memory then becomes unalterable unless WP is switched to V_{SS}.

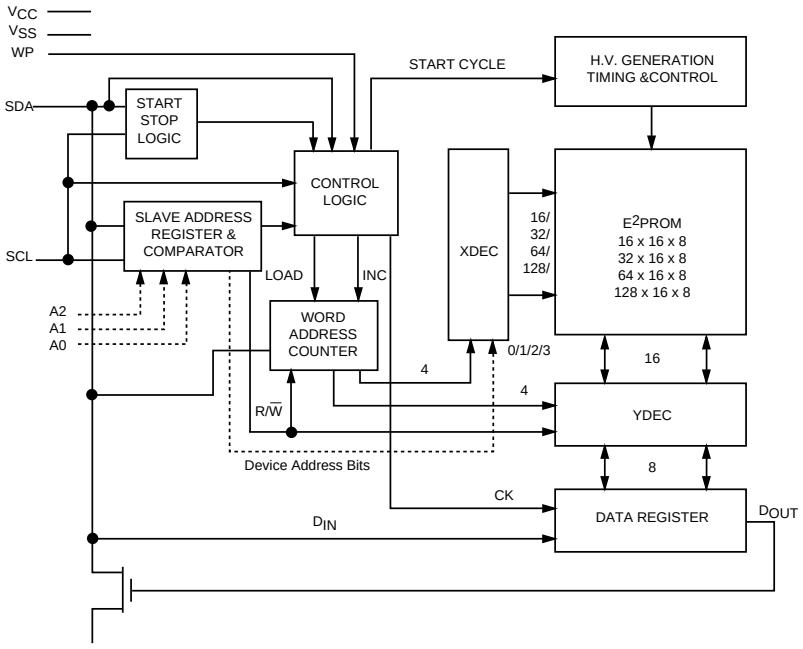
The communications protocol uses CLOCK (SCL) and DATA I/O (SDA) lines to synchronously clock data between the master (for example, a microprocessor) and the slave EEPROM device(s). This bus structure allows for a maximum of 16k of EEPROM memory, which is supported by the FSC family in 2k, 4k, 8k, and 16k devices, allowing the user to requires with any combination of EEPROMs (not to exceed 16k).

Fairchild EEPROMs are designed and tested for applications requiring high endurance, high reliability and low power consumption.

Features

- Extended operating voltage 2.7V - 5.5V
- 400kHz clock frequency (F)
- 500µA active current typical
- 10µA standby current typical
- 0.1µA standby current typical (LZ)
- I²C compatible interface
  - Provides bidirectional data transfer protocol
- Sixteen byte page write mode
  - Minimizes total write time per byte
- Self-timed write cycle
  - Typical write cycle time of 6 ms
- Hardware write protect for upper block (03/05/09/17) only
- Endurance: 10^6 data changes
- Data retention greater than 40 years

Block Diagram



NM25Cxxx

SPI Serial EEPROM Family

General Description

The NM25Cxxx devices are 2048/4096/16384 bit CMOS EEPROMs with a SPI compatible serial interface. They are designed for data storage in applications requiring both non-volatile memory and in-system data updates. This EEPROM is well suited for applications using the 68HC11 series of micro-controllers that support the SPI interface for high speed communications with peripheral devices via a serial bus to reduce pin count. The NM25Cxxx devices are implemented in Fairchild Semiconductor's floating gate CMOS process that provides superior endurance and data retention.

The serial data transmission of this device requires four signal lines to control the device operation: Chip Select (CS), Clock (SCK), Serial Data In (SI), and Serial Data Out (SO). All programming cycles are completely self-timed and do not require an erase before WRITE.

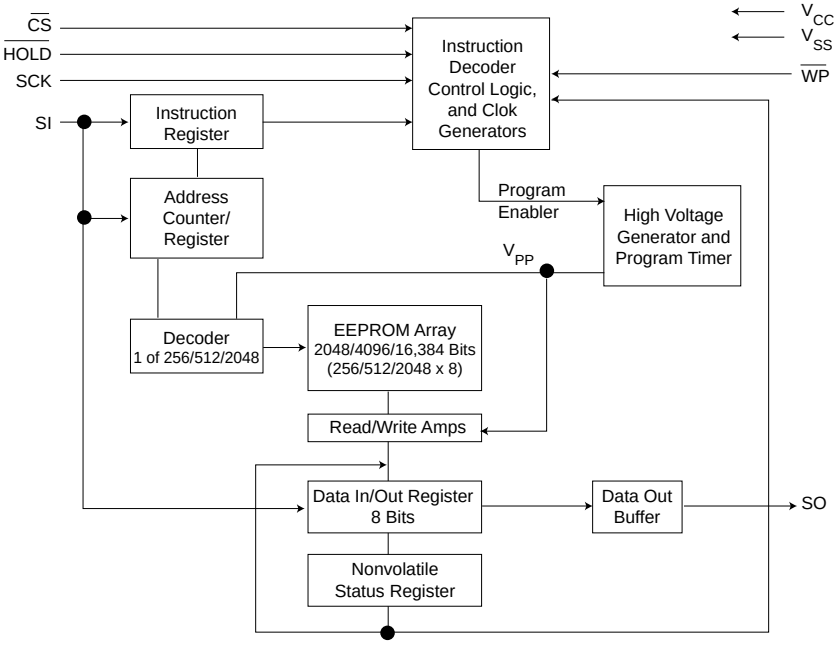
BLOCK WRITE protection is provided by programming the STATUS REGISTER with one of four levels of write protection. Additionally, separate write enable and write disable instructions are provided for data protection.

Hardware data protection is provided by the WP pin to protect against accidental data changes. The HOLD pin allows the serial communications to be suspended without resetting the serial sequence.

Features

- 2.1 MHz clock rate
- Multiple chips on the same 3-wire bus with separate chip select lines
- Self-timed programming cycle
- Simultaneous programming of 1 to 4 bytes at a time
- Status register can be polled during programming to monitor READY/BUSY
- Write Protect (WP) pin and write disable instruction for both hardware and software write protection
- Block write protect feature to protect against accidental writes
- Endurance: 10^6 data changes
- Data retention greater than 40 years

Block Diagram



NM93Cxx

MICROWIRE™ Serial EEPROM Family

General Description

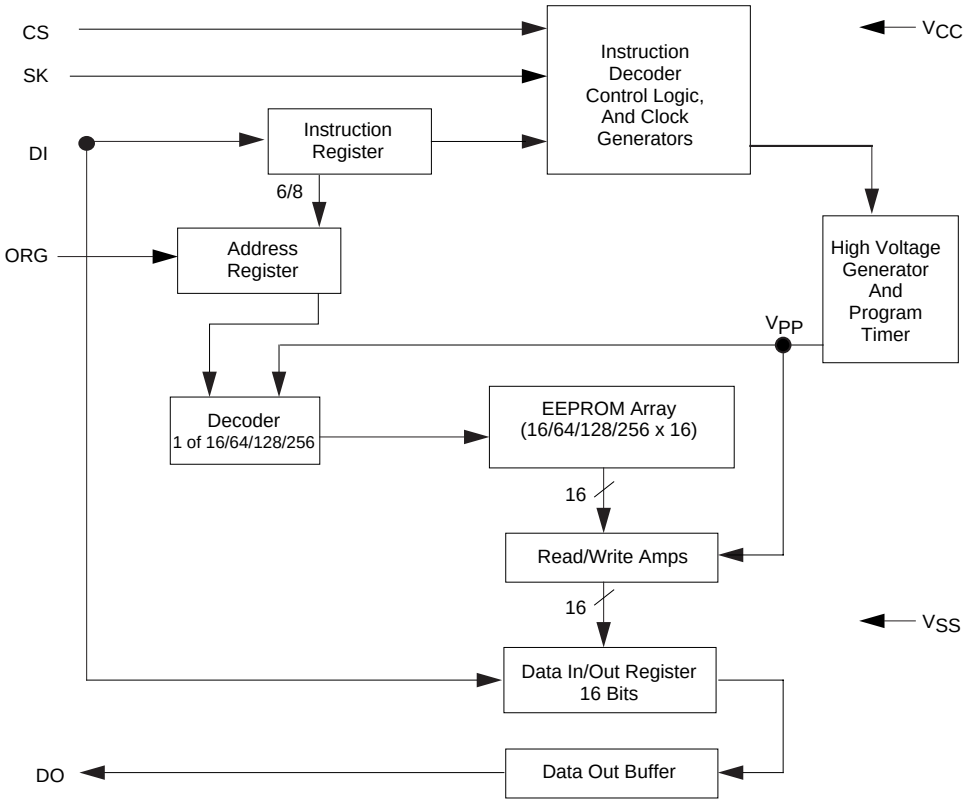
The NM93Cxx devices are 1024/2048/4096 bits of CMOS non-volatile electrically erasable memory divided into 16/64/128/256 16-bit registers. They are fabricated using Fairchild Semiconductor's floating-gate CMOS process for high reliability and low power consumption.

The EEPROM interfacing is MICROWIRE compatible for simple interface to standard microcontrollers and microprocessors. There are 7 instructions that control these devices: Read, Erase/Write Enable, Erase, Erase All, Write, Write All, and Erase/Write Disable. The ready/busy status is available on the DO pin during programming.

Features

- Device status during programming mode
- Typical active current of 200μA
- Typical standby current of 10μA
- No erase required before write
- Reliable CMOS floating-gate technology
- 4.5V-5.5V operation in all modes
- MICROWIRE compatible serial I/O
- Self-timed programming cycle
- 40 years data retention
- Endurance: 10^6 data changes

Block Diagram



NM93CxxA

MICROWIRE™ Serial EEPROM Family

General Description

The NM93CxxA devices are 1024/2048/4096/16384 bits of CMOS non-volatile electrically erasable memory available as either 64/128/256/1024 16-bit registers or 128/256/512/2048 8-bit registers. The user organization is determined by the status of the ORG input. The memory device is fabricated using Fairchild Semiconductor's floating gate CMOS process for high reliability, high endurance, and low power consumption.

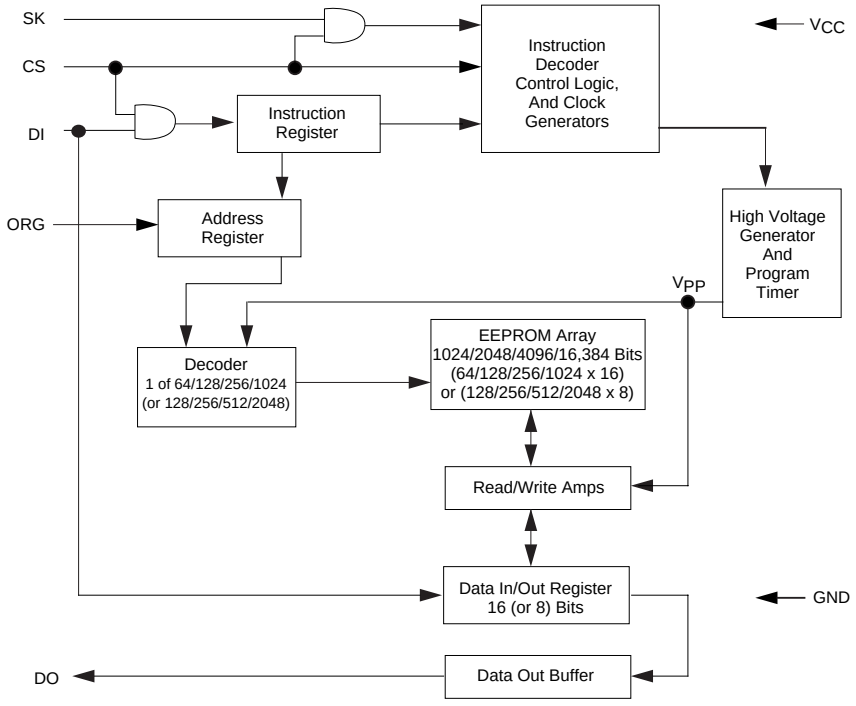
The EEPROMs are MICROWIRE compatible for simple interfacing to a wide variety of microcontrollers and microprocessors. There are 7 instructions that operate the devices: Read, Erase/Write Enable, Erase, Write, Erase/Write Disable, Write All, and Erase All.

The NM93CxxA devices default to the x16 configuration of the ORG input is left floating, as it is internally pulled up to V_{cc}.

Features

- 4.5-5.5V operation in all modes
- Typical active current of 200µA
- Typical standby current of 10µA
- Self-timed programming cycle
- Device status indication during programming mode
- No erase required before write
- Reliable CMOS floating gate technology
- MICROWIRE compatible serial I/O
- 40 years data retention
- Endurance: 10^6 data changes

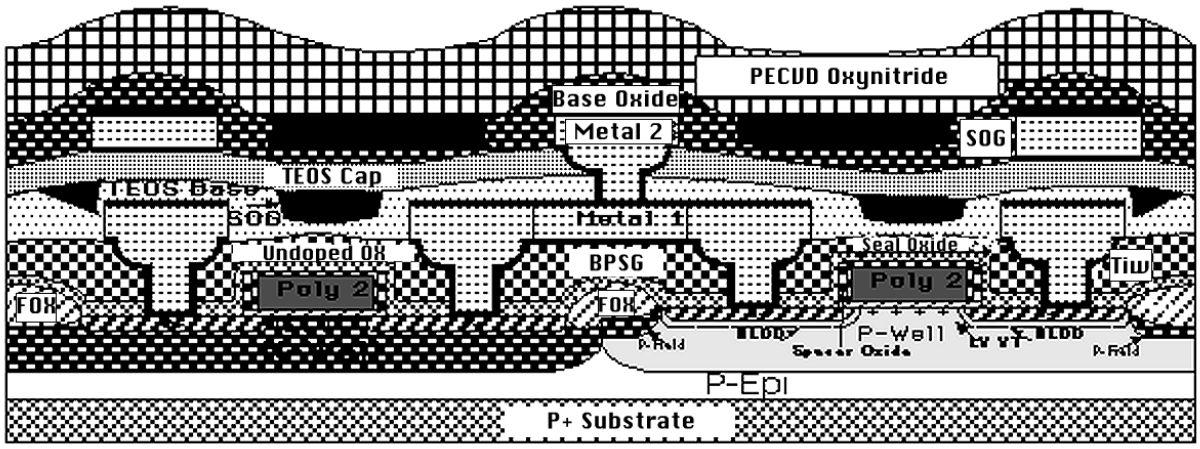
Block Diagram

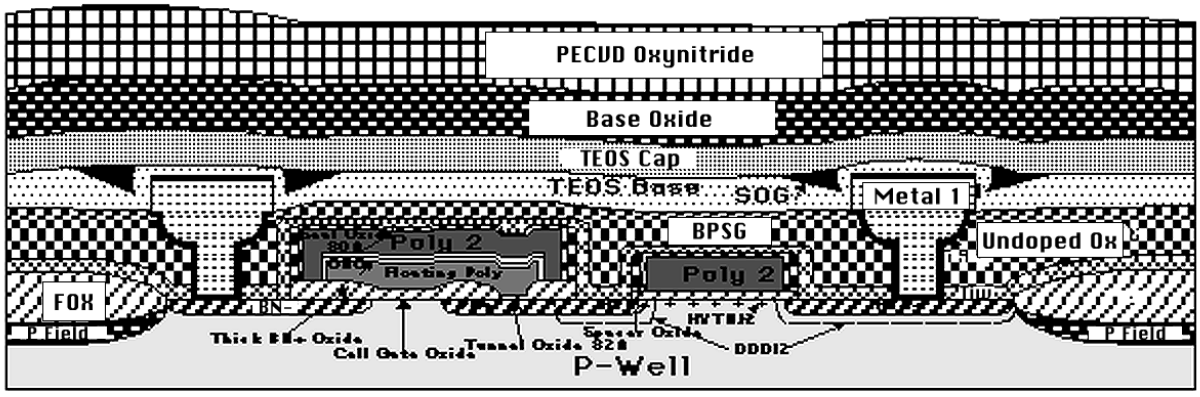


Die, Diagrams and Pad Location Data

FAIRCHILD
SEMICONDUCTOR™

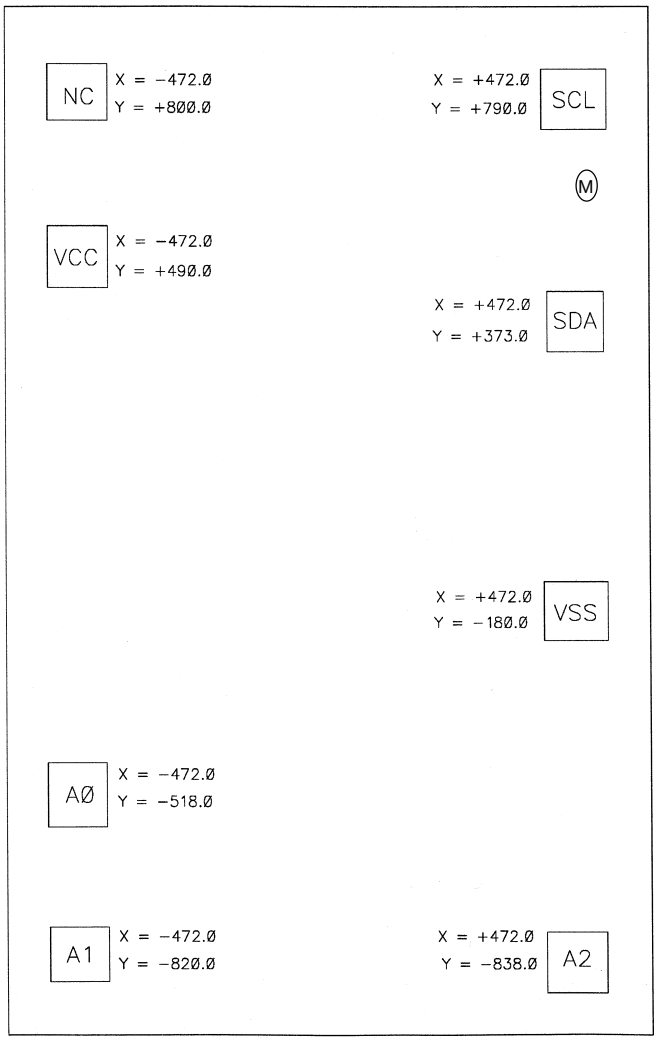
CS100HE2 Cross Section





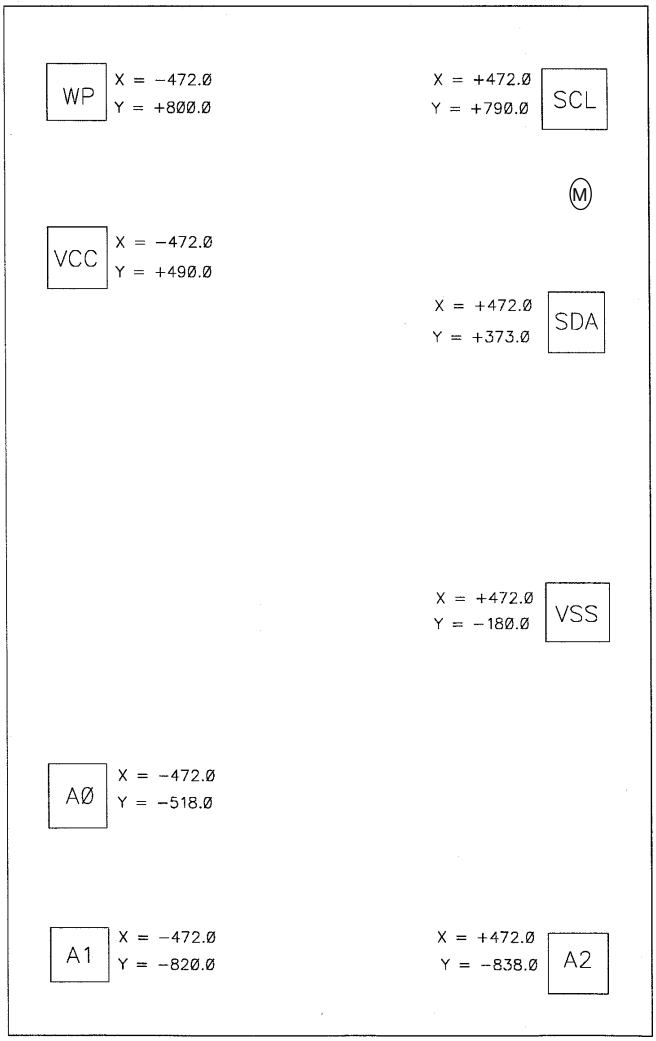
The die structure for Fairchild Semiconductor's CS100HE2 process here is illustrated for peripheral low-voltage transistors (upper diagram) and the EEPROM memory-array (lower diagram).

NM24C02 Die ID/Rev: NMC24C02C



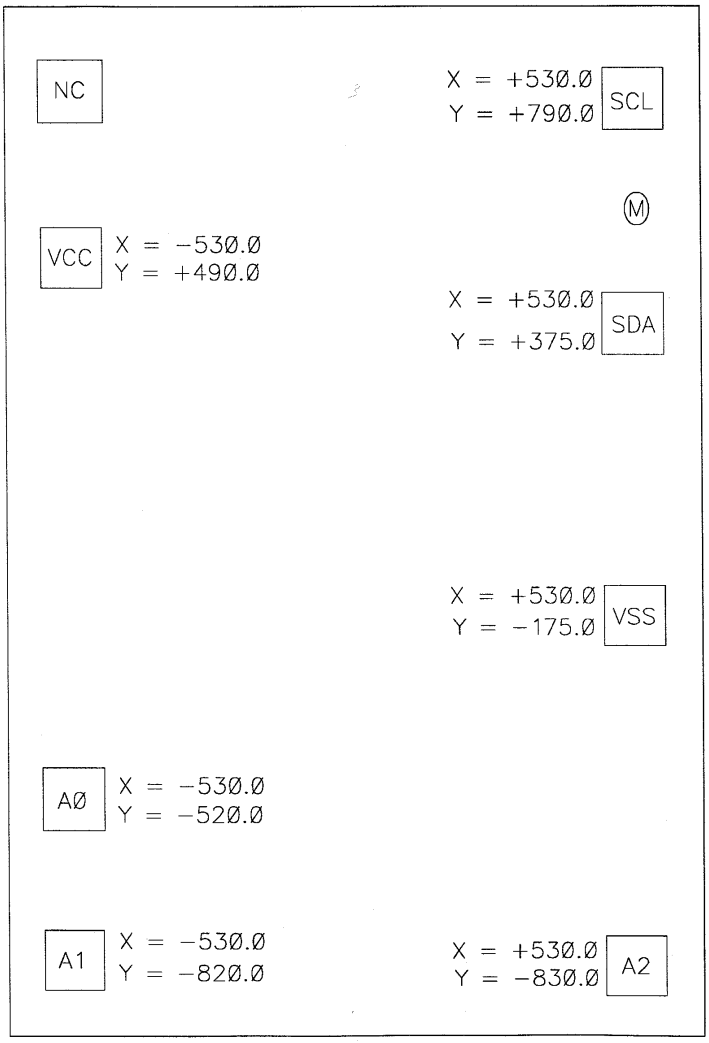
Die Size - X: 1172, Y: 1901 µ
Scribe Width - X: 80, Y: 80
Total Die Size - X: 1252, Y: 1981 µ
Typical Die/Wafer = 5721

Die ID/Rev: NMC24C02C NM24C03



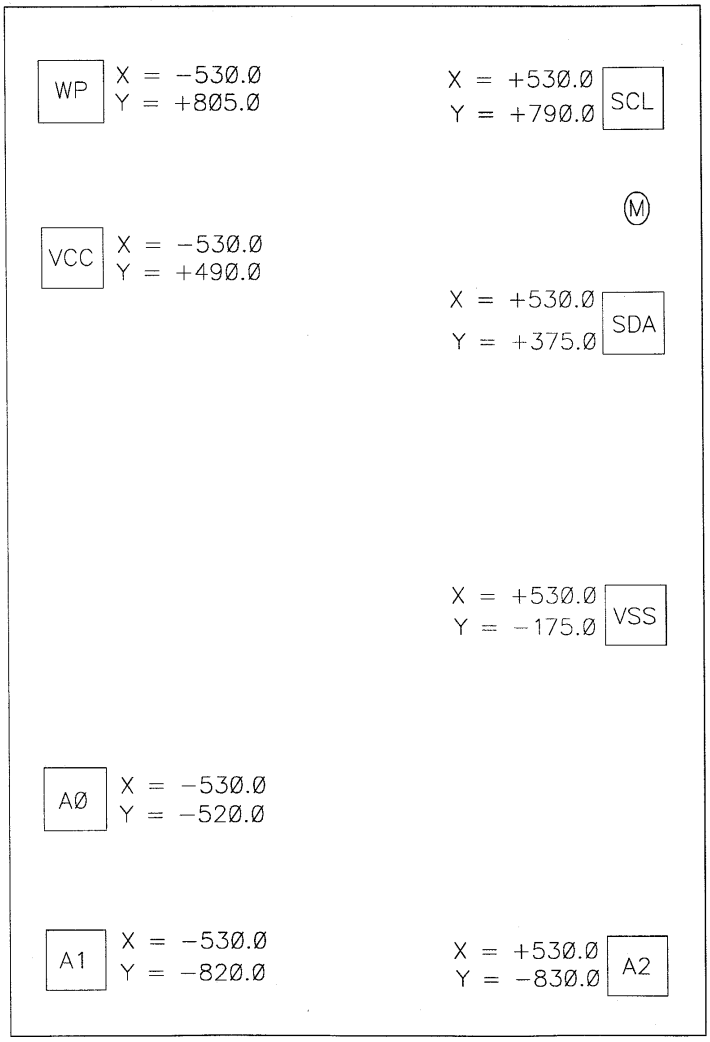
Die Size - X: 1172, Y: 1901 μ
Scribe Width - X: 80, Y: 80
Total Die Size - X: 1252, Y: 1981 μ
Typical Die/Wafer = 5721

NM24C04 Die ID/Rev: NMC24C04B



Die Size: 1299 x 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size: 1299 x 1901 µ
Typical Die/Wafer = 5150

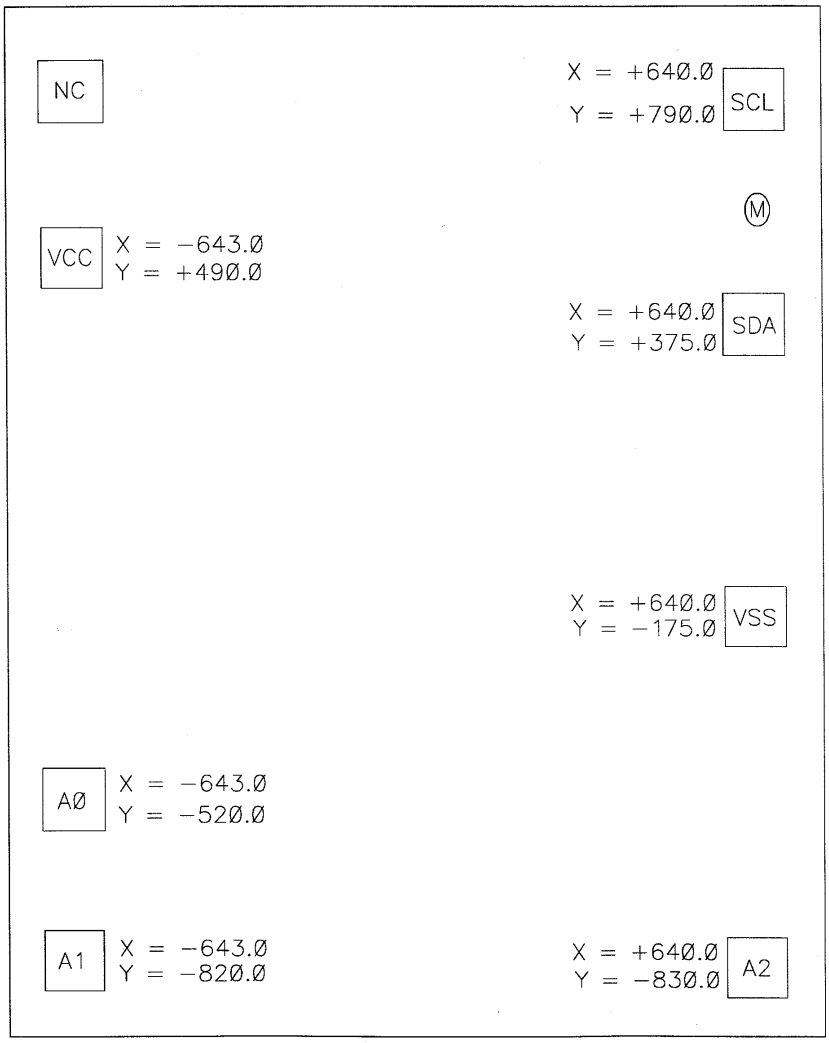
Die ID/Rev: NMC24C04B NM24C05



Die Size - X: 1299, Y: 1901 μ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1379, Y: 2101 μ
Typical Die/Wafer = 5150

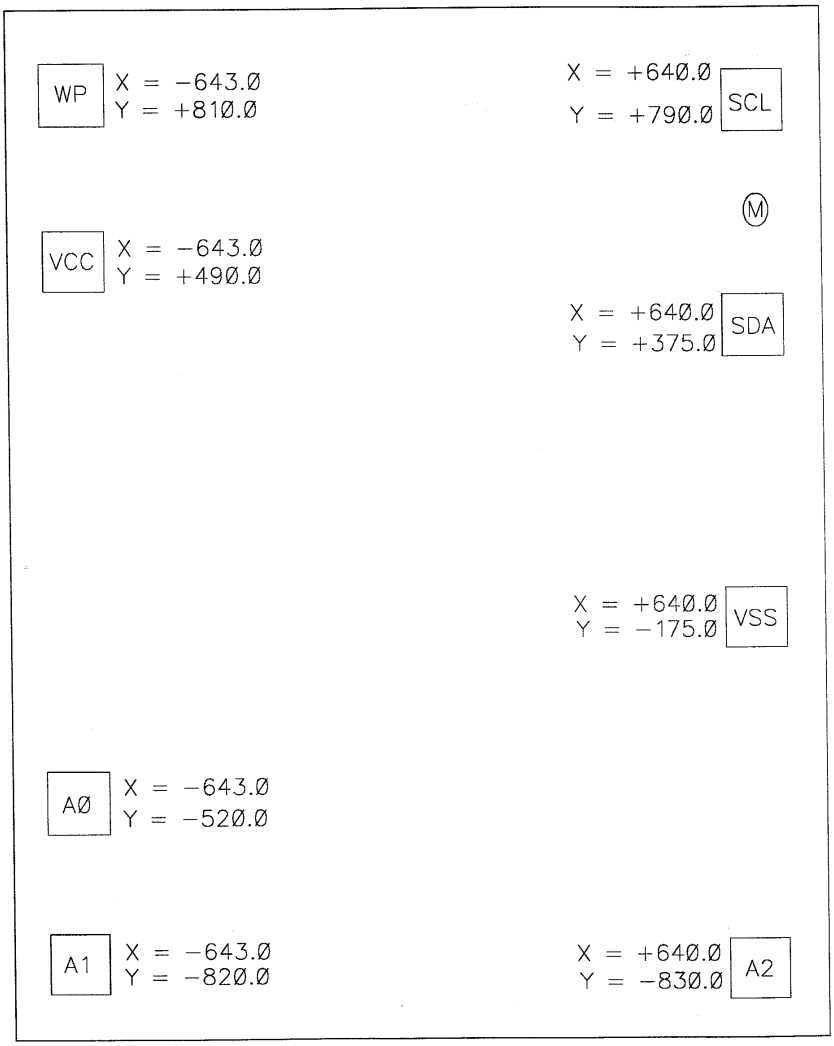
NM24C08

Die ID/Rev: NMC24C08A



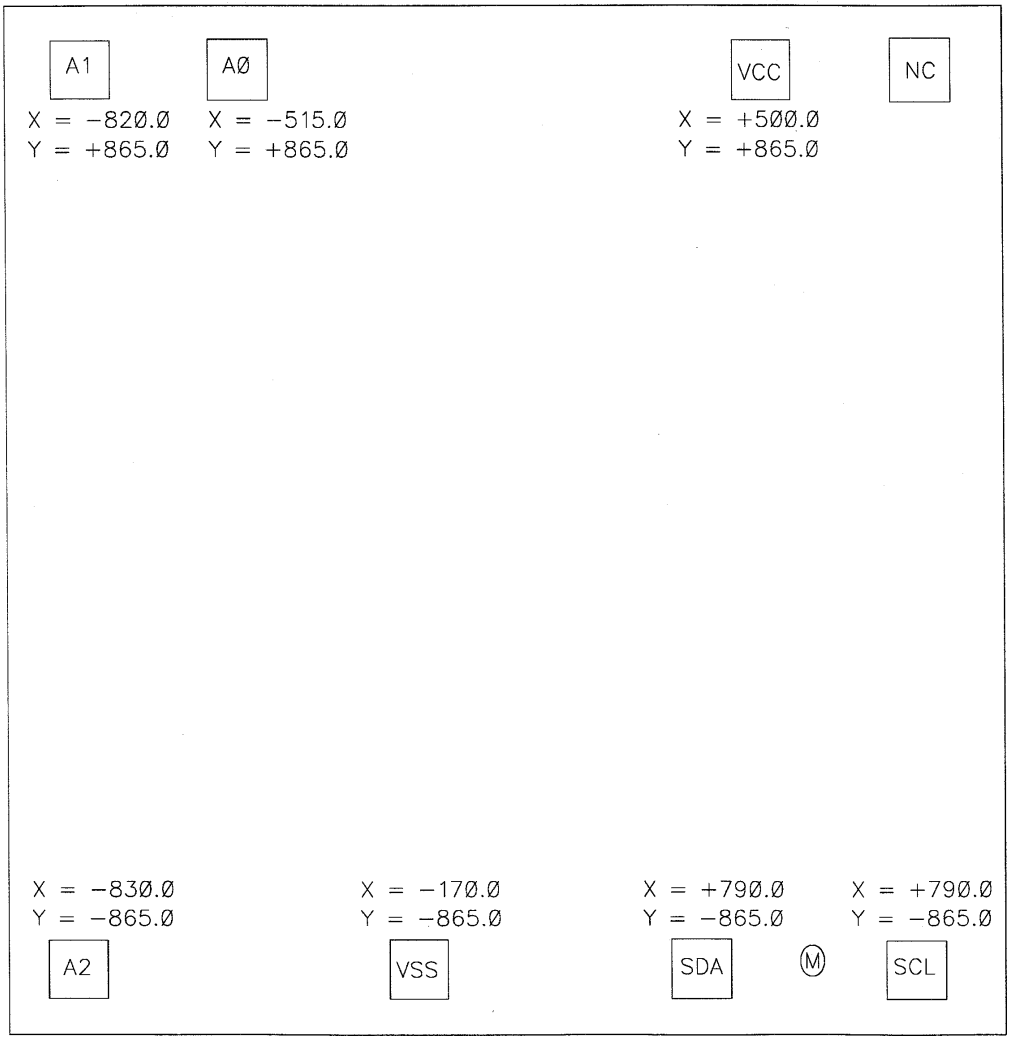
Die Size - X: 1527, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1607, Y: 2101 µ
Typical Die/Wafer = 4315

Die ID/Rev: NMC24C08A NM24C09



Die Size - X: 1527, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1607, Y: 2101 µ
Typical Die/Wafer = 4315

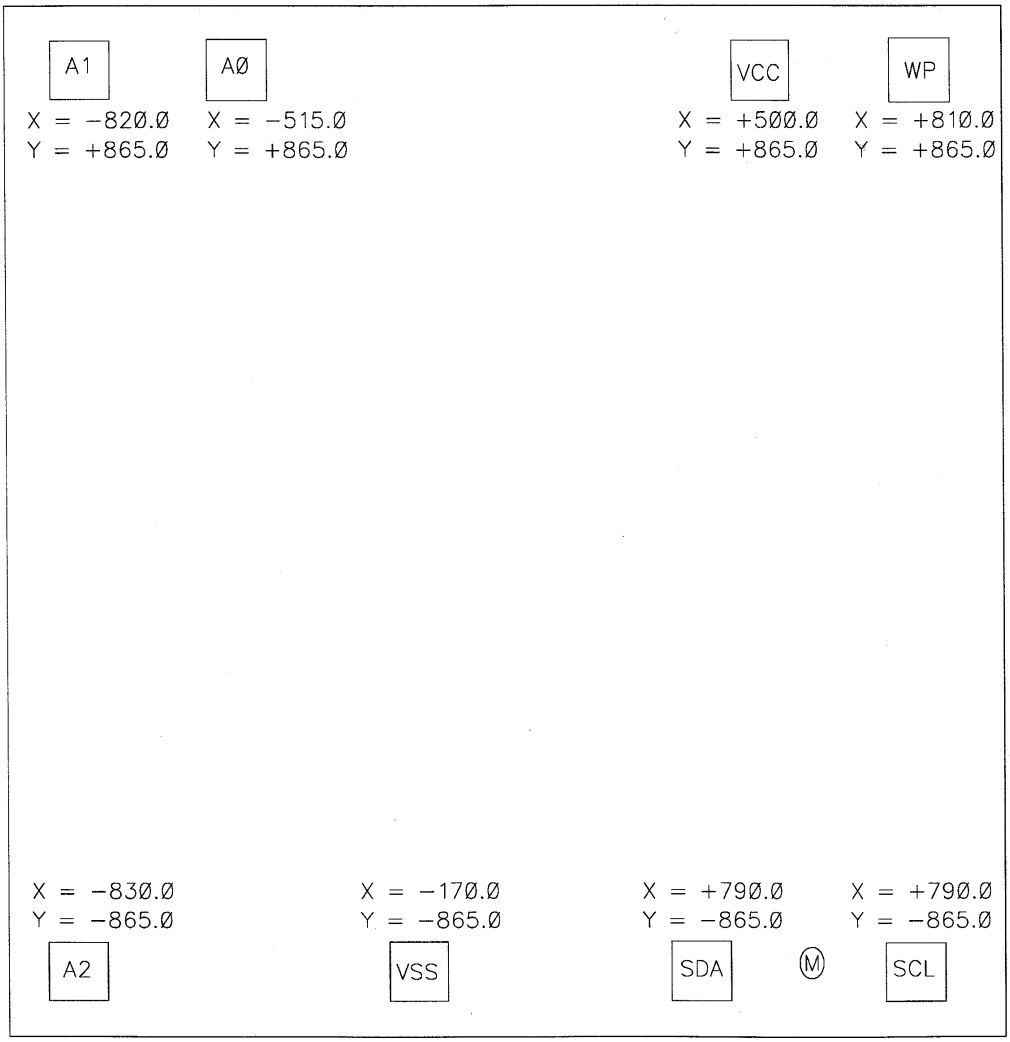
NM24C16 Die ID/Rev: NMC99C16A



Die Size - X: 1952, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Die Size - X: 2032, Y: 2101 µ
Typical Die/Wafer = 3620

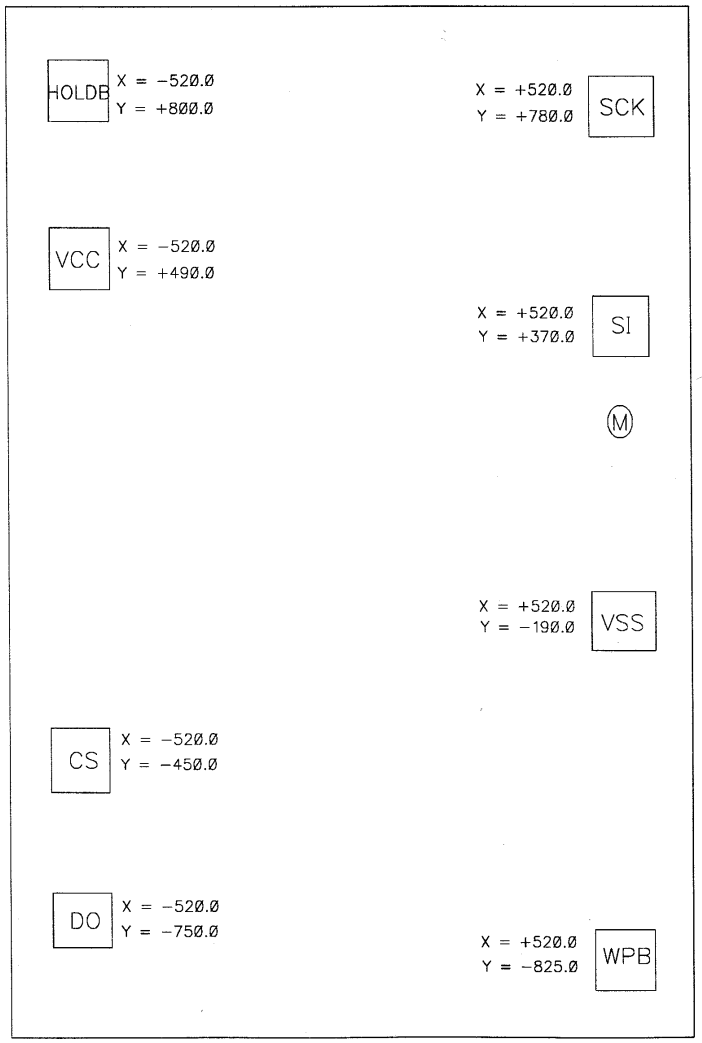
Coming 4th Qtr '97 - ISO Standard 7816 Pad Locations

Die ID/Rev: NMC99C16A NM24C17



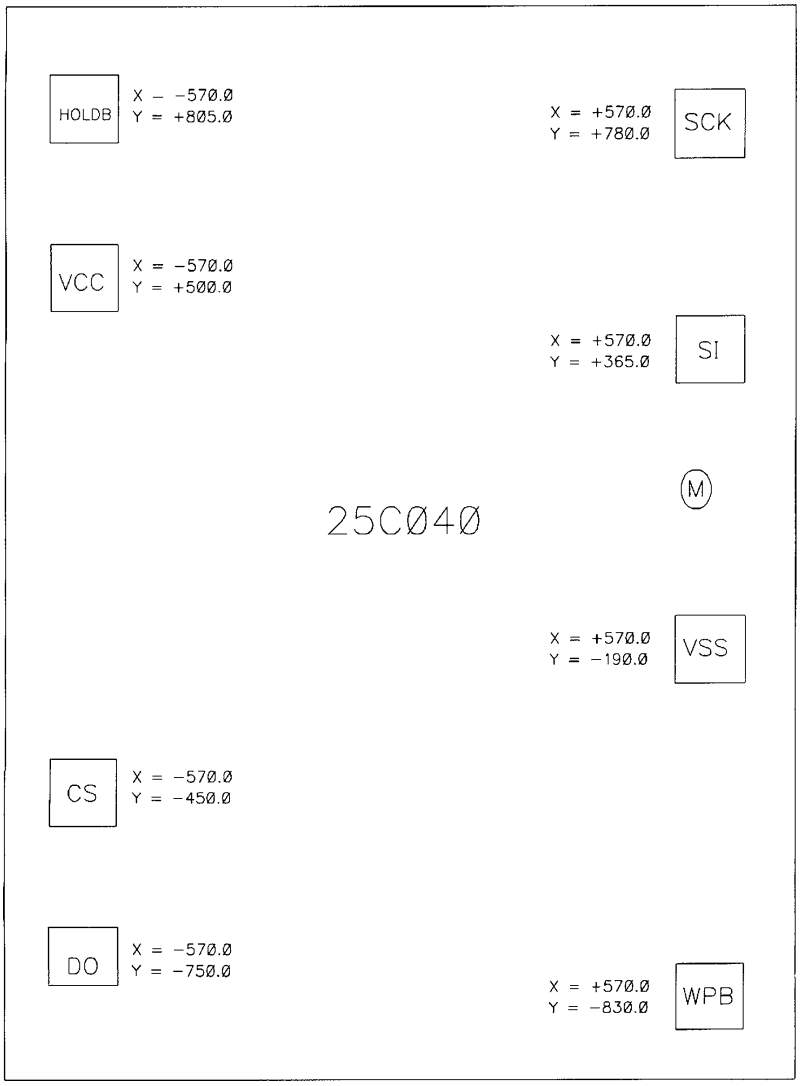
Die Size - X: 1952, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 2032, Y: 2101 µ
Typical Die/Wafer = 3620

NM25C020 Die ID/Rev: NMC25C02A



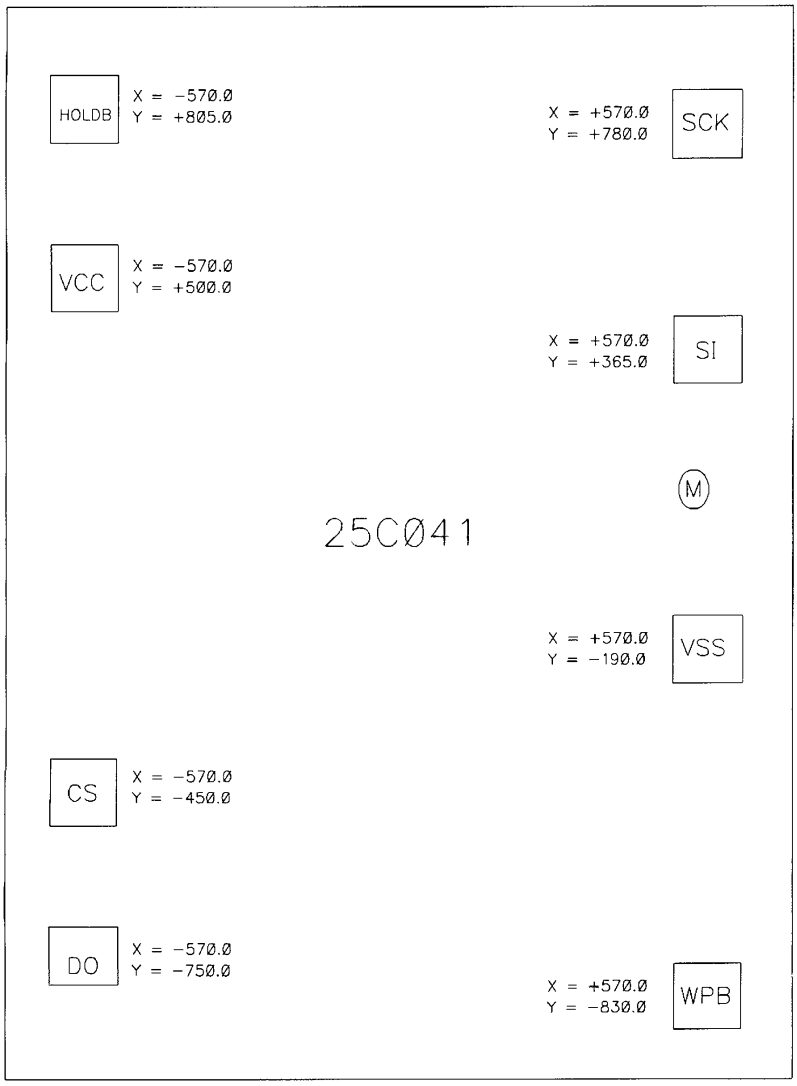
Die Size - X: 1263, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1343, Y: 2101 µ
Typical Die/Wafer = 5315

Die ID/Rev: NMC25C04A NM25C040



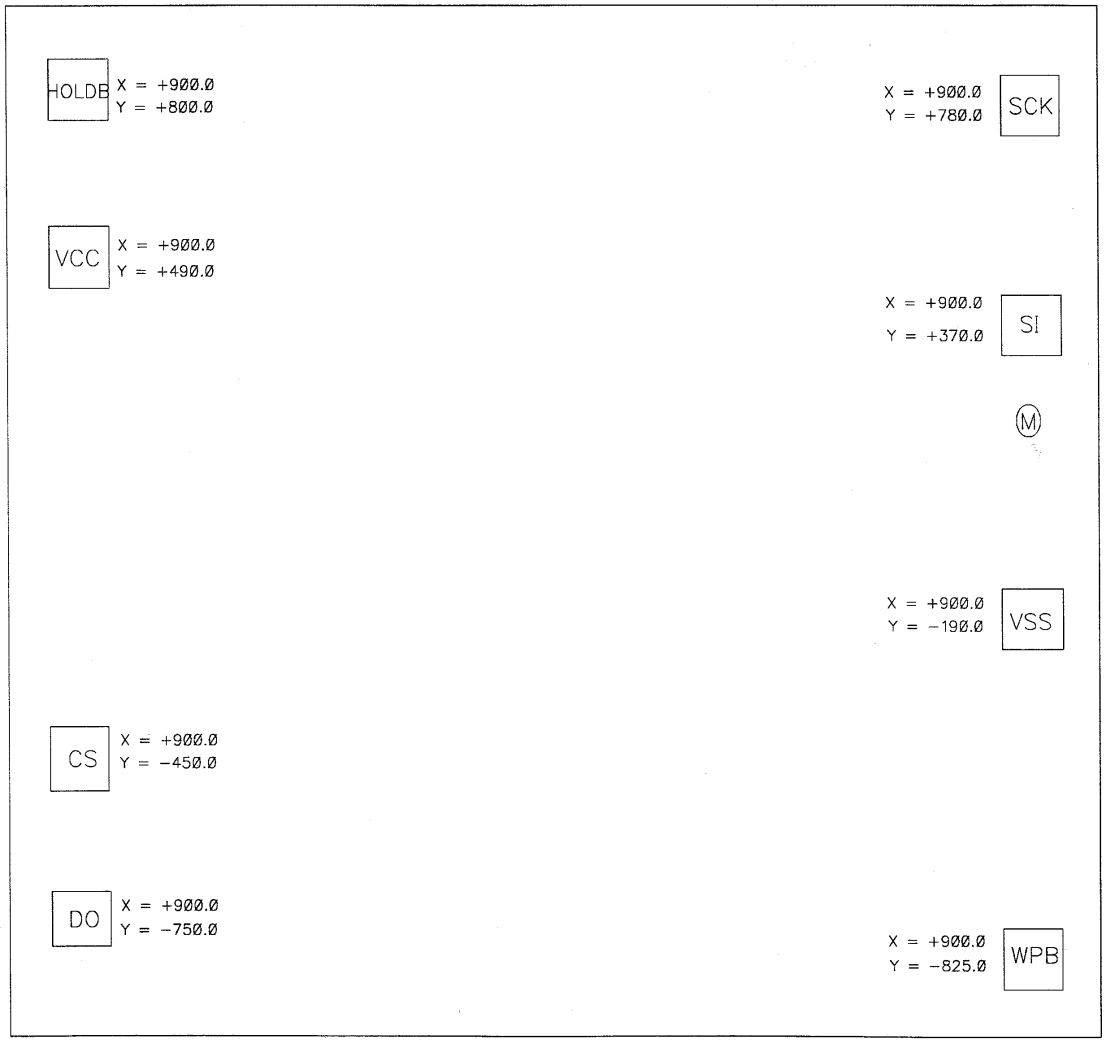
Die Size - X: 1375, Y: 1901 µ
Scribe Width - X: 80, Y: 80
Total Die Size: 1455 x 1981 µ
Good Die/Wafer = 4915

NM25C041 Die ID/Rev: NMC25C05A



Die Size - X: 1375, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1455, Y: 2101 µ
Good Die/Wafer = 4915

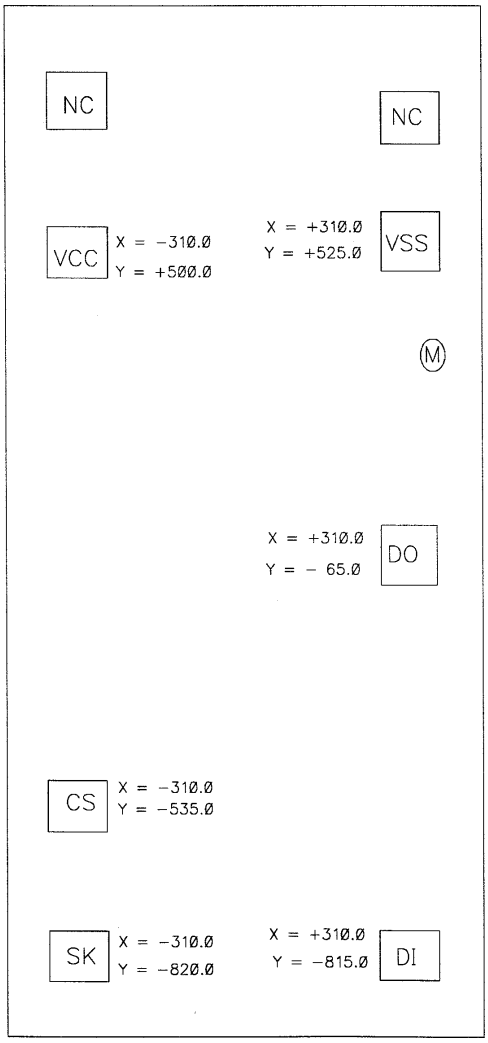
Die ID/Rev: NMC25C16A NM25C160



Die Size - X: 2305, Y: 1901 μ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 2385, Y: 2101 μ
Typical Die/Wafer = 3497

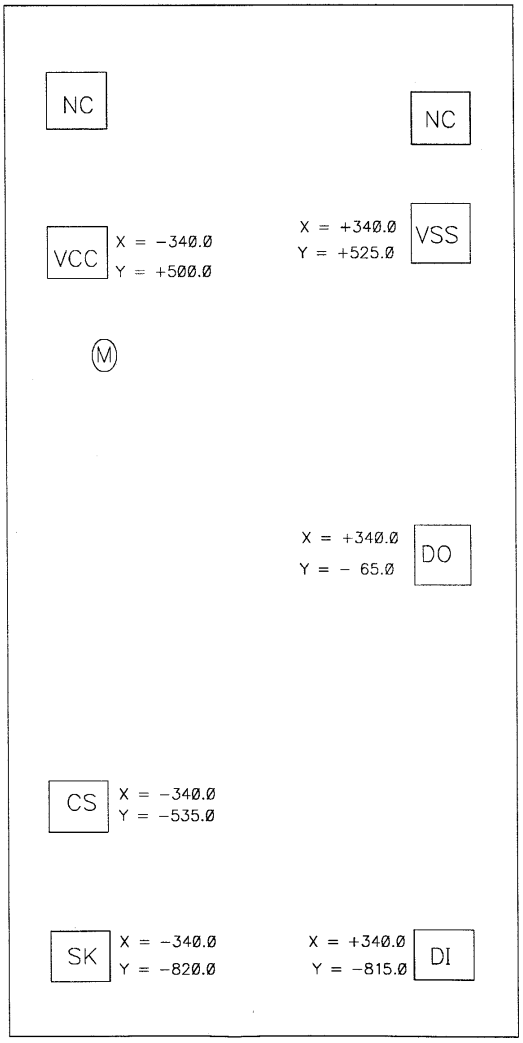
NM93C46

Die ID/Rev: NMC93C46E



Die Size - X: 862, Y: 1901 μ
Scribe Width - X: 80, Y: 80
Total Die Size - X: 942, Y: 1981 μ
Typical Die/Wafer = 7700

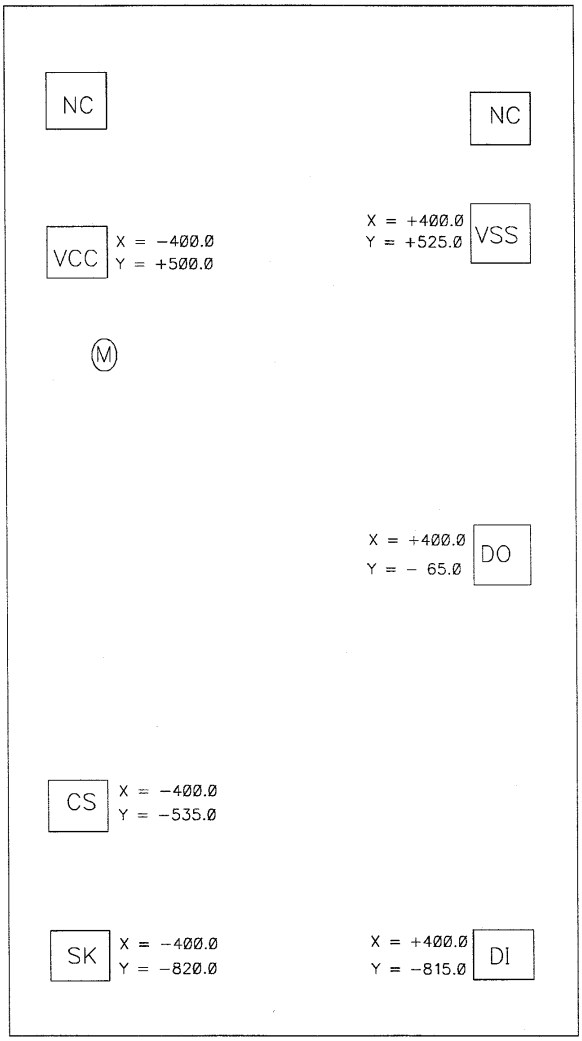
Die ID/Rev: NMC93C56C NM93C56



Die Size - X: 994, Y: 1901 μ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1074, Y: 2101 μ
Typical Die/Wafer = 6300

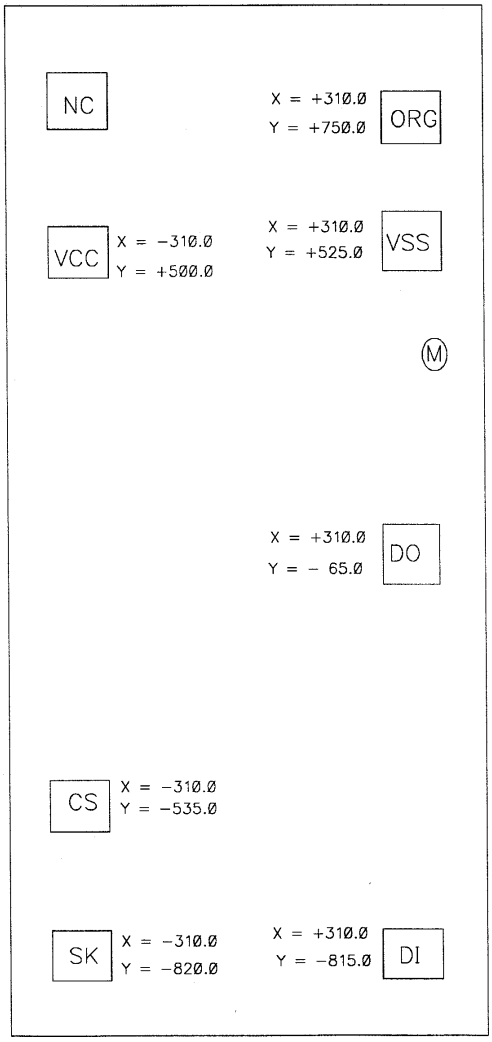
NM93C66

Die ID/Rev: NMC93C66B



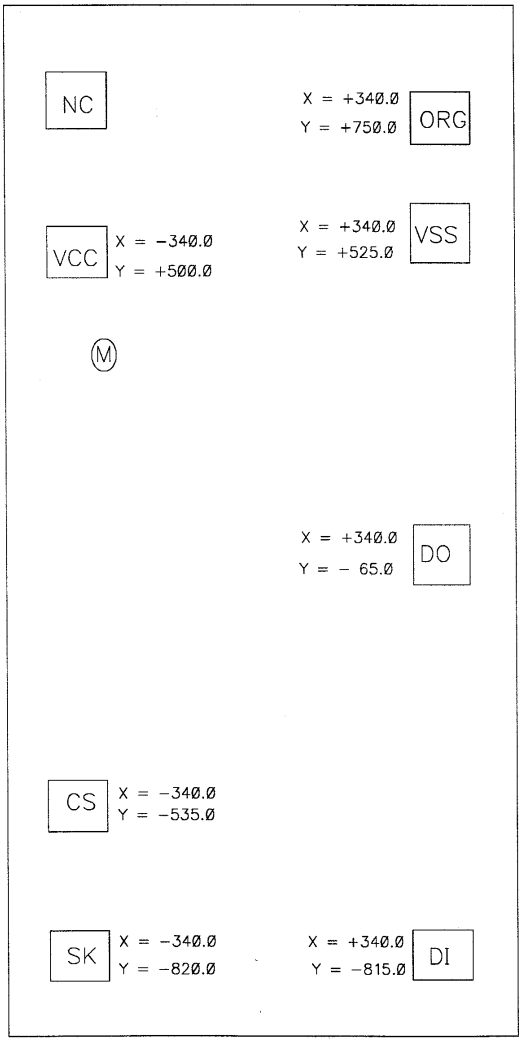
Die Size - X: 1095, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1175, Y: 2101 µ
Typical Die/Wafer = 6000

Die ID/Rev: NMC93C46E NM93C46A



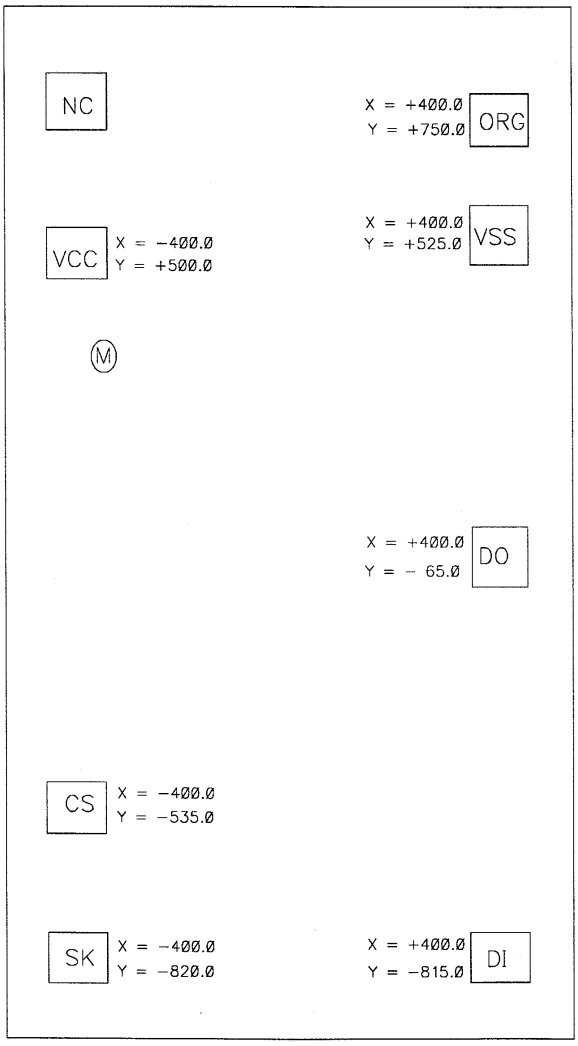
Die Size - X: 862, Y: 1901 μ
Scribe Width - X: 80, Y: 80
Total Die Size - X: 942, Y: 1981 μ
Typical Die/Wafer = 7612

NM93C56A Die ID/Rev: NMC93C56C



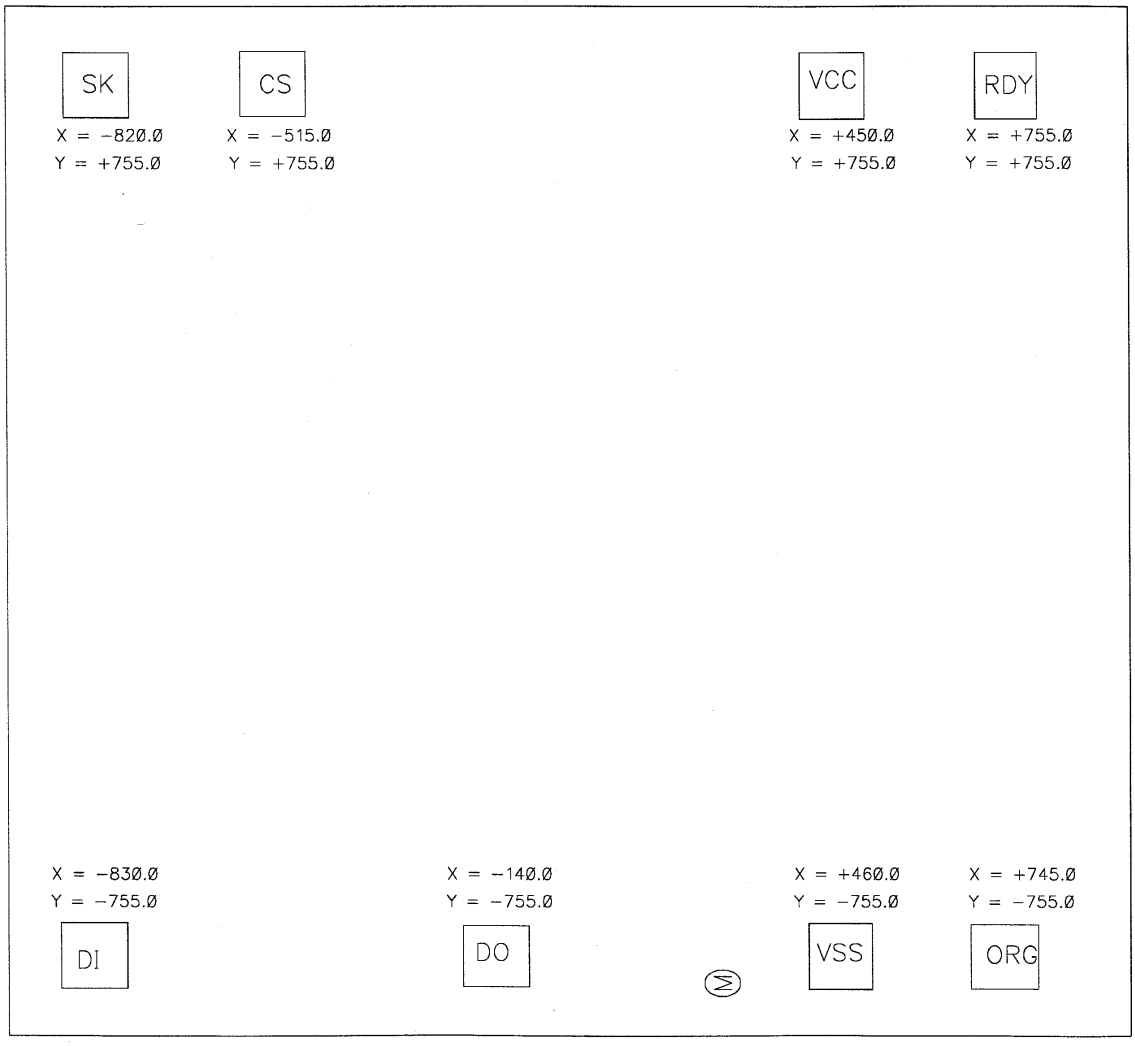
Die Size - X: 994, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1074, Y: 2101 µ
Typical Die/Wafer = 6300

Die ID/Rev: NMC93C66B NM93C66A



Die Size - X: 1095, Y: 1901 μ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1175, Y: 2101 μ
Typical Die/Wafer = 6000

NM93C86A Die ID/Rev: NMC93C86A

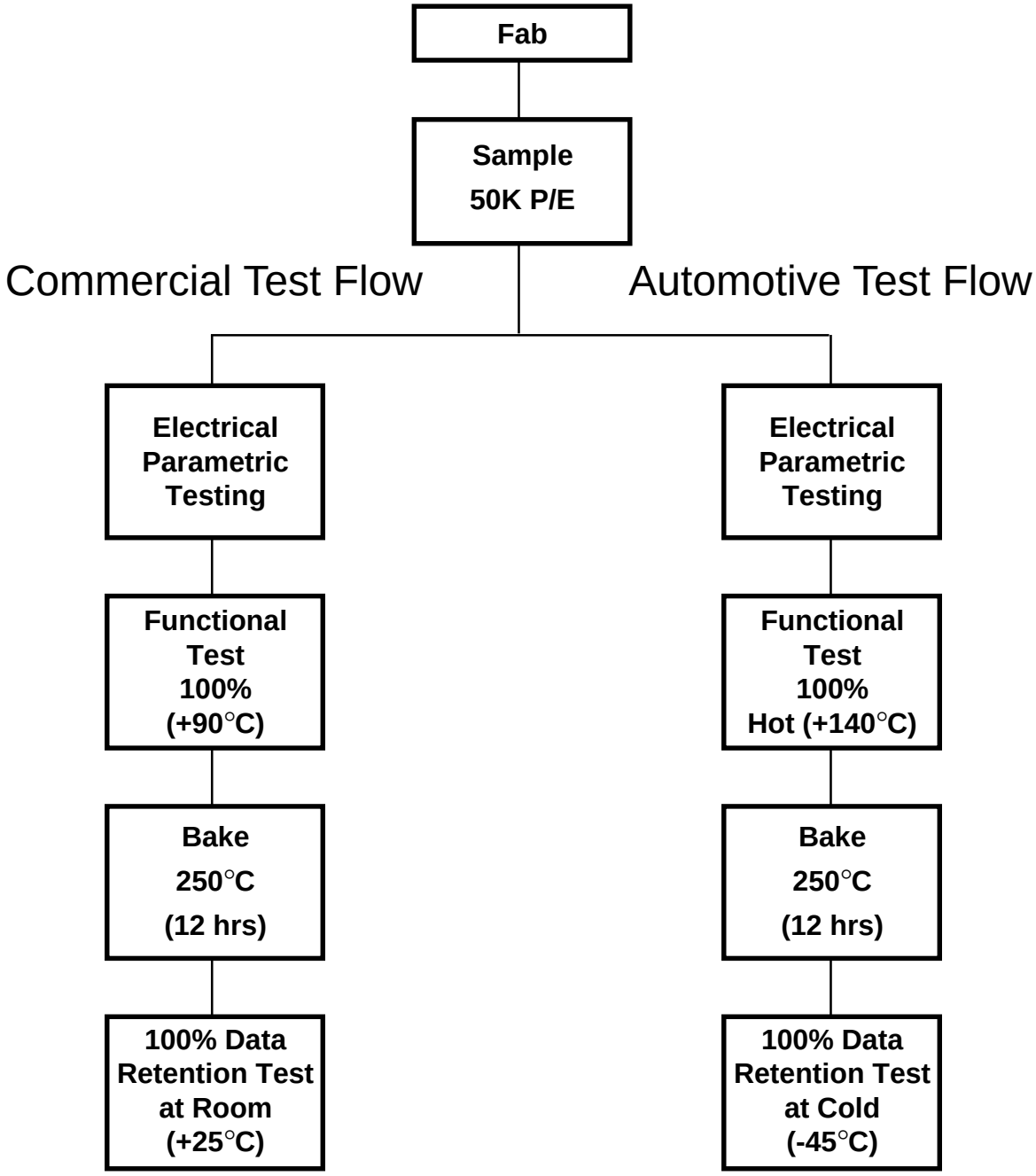


Die Size - X: 1756, Y: 1901 µ
Scribe Width - X: 80, Y: 200
Total Die Size - X: 1836, Y: 2101 µ
Typical Die/Wafer = 3850

Testing Flows

The standard die product conforms to the same DC, AC and functional specifications defined in the product datasheet. Appropriately packaged die will also meet the reliability standards established for packaged devices.

The following chart describes the standard test flow through the process.



Ordering Information

FAIRCHILD
SEMICONDUCTOR™

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C02LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C02LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C02LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C02V DICE	Automotive	DP	4.5V-5.5V
NM24C02V DWF	Automotive	WP	4.5V-5.5V
NM24C02V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C03LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C03LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C03LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C03V DICE	Automotive	DP	4.5V-5.5V
NM24C03V DWF	Automotive	WP	4.5V-5.5V
NM24C03V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C04LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C04LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C04LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C04V DICE	Automotive	DP	4.5V-5.5V
NM24C04V DWF	Automotive	WP	4.5V-5.5V
NM24C04V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C05LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C05LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C05LZ TAPE	Commercial	EP	2.7V-5.5V(ICCSB<1µA)
NM24C05V DICE	Automotive	DP	4.5V-5.5V
NM24C05V DWF	Automotive	WP	4.5V-5.5V
NM24C05V TAPE	Automotive	EP	4.5V-5.5V

** Operating Temperatures: Commercial = 0°C to +70°C; Automotive = -40°C to +125°C*

Thinner Die is available and requires a special flow. Contact your Sales Representative for further details.

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C08LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C08LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C08LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C08V DICE	Automotive	DP	4.5V-5.5V
NM24C08V DWF	Automotive	WP	4.5V-5.5V
NM24C08V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C09LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C09LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C09LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C09V DICE	Automotive	DP	4.5V-5.5V
NM24C09V DWF	Automotive	WP	4.5V-5.5V
NM24C09V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C16LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C16LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C16LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C16V DICE	Automotive	DP	4.5V-5.5V
NM24C16V DWF	Automotive	WP	4.5V-5.5V
NM24C16V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM24C17LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C17LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C17LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM24C17V DICE	Automotive	DP	4.5V-5.5V
NM24C17V DWF	Automotive	WP	4.5V-5.5V
NM24C17V TAPE	Automotive	EP	4.5V-5.5V

** Operating Temperatures: Commercial = 0°C to +70°C; Automotive = -40°C to +125°C*

Thinner Die is available and requires a special flow. Contact your Sales Representative for further details.

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM25C020LZ DICE	Commercial	DP	2.7V-5.5V(ICCSB<1µA)
NM25C020LZ DWF	Commercial	WP	2.7V-5.5V(ICCSB<1µA)
NM25C020LZ TAPE	Commercial	EP	2.7V-5.5V(ICCSB<1µA)

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM25C040LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM25C040LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM25C040LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM25C041LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM25C041LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM25C041LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM25C160LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM25C160LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM25C160LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C46LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C46LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C46LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C46V DICE	Automotive	DP	4.5V-5.5V
NM93C46V DWF	Automotive	WP	4.5V-5.5V
NM93C46V TAPE	Automotive	EP	4.5V-5.5V

** Operating Temperatures: Commercial = 0°C to +70°C; Automotive = -40°C to +125°C*

Thinner Die is available and requires a special flow. Contact your Sales Representative for further details.

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C56LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C56LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C56LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C56V DICE	Automotive	DP	4.5V-5.5V
NM93C56V DWF	Automotive	WP	4.5V-5.5V
NM93C56V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C66LZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C66LZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C66LZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C66V DICE	Automotive	DP	4.5V-5.5V
NM93C66V DWF	Automotive	WP	4.5V-5.5V
NM93C66V TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C46ALZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C46ALZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C46ALZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C46AV DICE	Automotive	DP	4.5V-5.5V
NM93C46AV DWF	Automotive	WP	4.5V-5.5V
NM93C46AV TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C56ALZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C56ALZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C56ALZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C56AV DICE	Automotive	DP	4.5V-5.5V
NM93C56AV DWF	Automotive	WP	4.5V-5.5V
NM93C56AV TAPE	Automotive	EP	4.5V-5.5V

** Operating Temperatures: Commercial = 0°C to +70°C; Automotive = -40°C to +125°C*

Thinner Die is available and requires a special flow. Contact your Sales Representative for further details.

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C66ALZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C66ALZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C66ALZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C66AV DICE	Automotive	DP	4.5V-5.5V
NM93C66AV DWF	Automotive	WP	4.5V-5.5V
NM93C66AV TAPE	Automotive	EP	4.5V-5.5V

Order Number	Operating* Temperature	Shipment Packaging	Operating Voltage
NM93C86ALZ DICE	Commercial	DP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C86ALZ DWF	Commercial	WP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C86ALZ TAPE	Commercial	EP	2.7V-5.5V(I_{CCSB}<1µA)
NM93C86AV DICE	Automotive	DP	4.5V-5.5V
NM93C86AV DWF	Automotive	WP	4.5V-5.5V
NM93C86AV TAPE	Automotive	EP	4.5V-5.5V

** Operating Temperatures: Commercial = 0°C to +70°C; Automotive = -40°C to +125°C*

Thinner Die is available and requires a special flow. Contact your Sales Representative for further details.

Shipment Packaging

Wafers

Wafer **P**ackaging *(150mm/6" wafer size)* (WP)

Wafers shipped in the wafer pack are packaged in an appropriately sized container separated by lint free paper. The good die are highlighted through the inking of bad die. The wafers are unsawn. A label with lot number, quantity, part number and packing date is placed on the shipping container.

Extender **P**ackaging *(150mm/6" wafer size)* (EP)

Wafers shipped in the extended wafer pack are packaged in an appropriately sized container separated by lint free paper. The good die are highlighted through the inking of bad die. The wafers are sawn and are stuck on extender tape. A label with lot number, quantity, part number and packing date is placed on the shipping container.

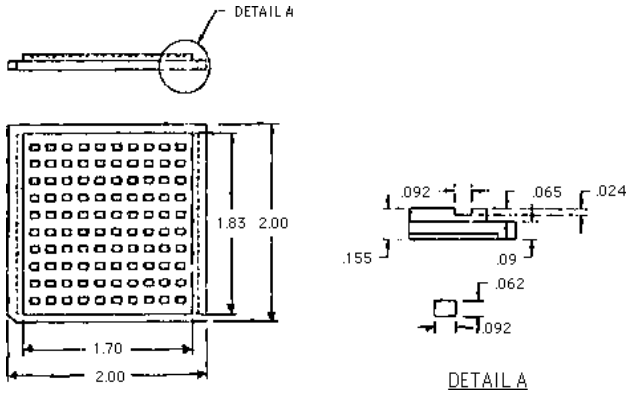
Die

Standard **D**ie **P**ackaging (DP)

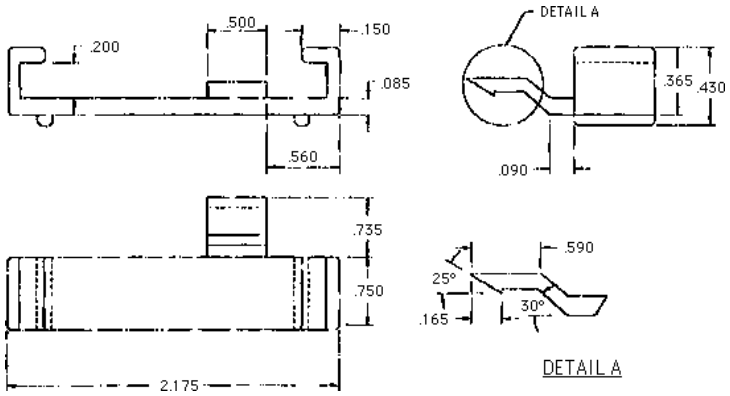
The die are packaged in waffle packs to permit easy access to die while preventing die rotation during shipment. The die are covered with a sheet of lint free paper to reduce the chance of particulate contamination. The waffle pack is closed and labeled. The label contains the following information: die type, lot number and quantity. Die do not require cleaning prior to assembly.

Standard Die Packaging

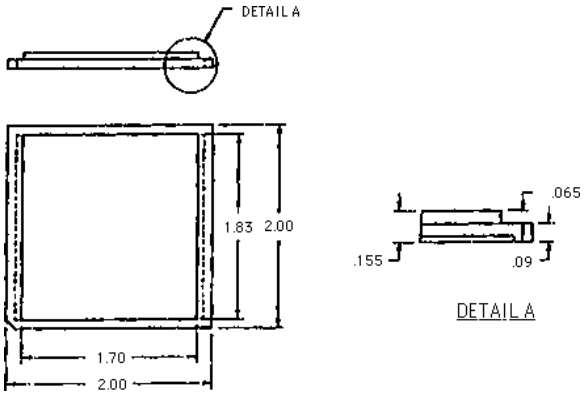
Chip Tray



Carrier Clip



Chip Tray Cover



Standard Die Packaging

Pocket Size	Pocket Depth	Capacity	EDM Finish	Wash Hole Size	Tweezer Slot Width	Diagram Number	Ordering Number	Standard Materials
.060" square (1.52mm)	.018" (.61mm)	400	No	NA	NA	1	H20-060-24	-1415 -62C02 -74D06L
.062" x .092" (1.57mm x 2.34mm)	.035" (.89mm)	100	No	NA	NA	1	H20-062092	-1415 -62C02
.210" square (5.33mm)	.024" (.61mm)	49	No	NA	NA	1	H20-210-24	-1415 -62C02 -66C02 -74D10
.230" square (5.84mm)	.032" (.81mm)	36	No	NA	NA	2	H20-229	-1415 -62C02
.250" square (6.35mm)	.024" (.61mm)	36	No	NA	NA	1	H20-250-24	-1415 -62C02 -66C02
.280" square (7.11mm)	.024" (.61mm)	36	No	NA	NA	1	H20-280-24	-1415 -62C02 -66C02

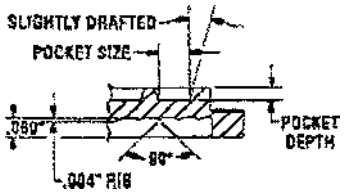


Diagram #1

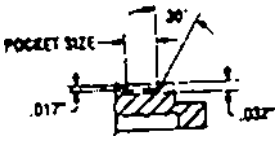


Diagram #2

Normally, the chip trays have the same outer dimension except the die pocket will be changed to serve and fit with the die size.

The die pocket has 2 shapes, Rectangular and Square cavity. We will select the available chip pocket which matches with the die we will pack by the following rule:

- bigger than the die at least 0.001 inch each side
- the clearance of die to chip pocket not bigger than 0.004 inch for each side

Additional Information

FAIRCHILD
SEMICONDUCTOR™

Recommended L/B parameters for ASM AB-309/309A (ASM lead bond machine)

1. Au Wire size 0.9, 1.0 mil

	Pad (1)		Lead (2)
Power Base	80-100		120-200
Force Base	35-45		120-200
Time Base	20-25		20
Search Force	40-60		80-120
Power Delay		5	
Scrub Amplitude		3	

2. Au Wire Size 1.3 mil

	Pad (1)		Lead (2)
Power Base	90-120		120-200
Force Base	40-60		120-200
Time Base	20-30		20
Search Force	100-120		80-120
Power Delay		5	
Scrub Amplitude		3	

3. Impact Parameters

Contact Time (1)	5-10
Contact Power (1)	70-100
Contact Force (1)	70-100

4. Heater Block Temp 230°C ± 5°